

ABSTRACT

The present invention provides an organic light-emitting device (OLED) is comprised of: (a) a cathode for external negative bias lead; (b) an anode for external positive bias lead; (c) an embedded charge injection electrode (ECIE) between the aforementioned cathode and anode; (d) an active region emitting light between the cathode and the anode. The ECIE is selected from low work function elements including Ca, Mg, Al, Ag, Au, Ni, Fe, Ni, and Co, bilayers including Fluorides /Al, Mg/Ag, Ca/Al, and trilayers of Fluorides/Al/Fluorides, Fluorides/Al/(Ca, Mg). The light-emitting layer is elected from conjugated small organic molecules and polymers. The anode is selected based from known high work function materials including ITO, SnO₂, Ni, Pt, Au, p++ semiconductors (c-Si, a-Si, a-Si:H, poly silicon). The cathode is selected from one or more layers of high electrical conductive metals and alloys such as ITO, Al, Cr, Cu, Ag, Au, Ni, Fe, Ni, W, Mo and Co. The embedded charge injection electrode may be used as an optical interference layer, and the electron transport layer, hole transport or light emission layer as spacers depending on the location of the ICIE. Destructive optical interference from the embedded charge injection electrode and the reflective cathode or anode reduces ambient-light reflection.